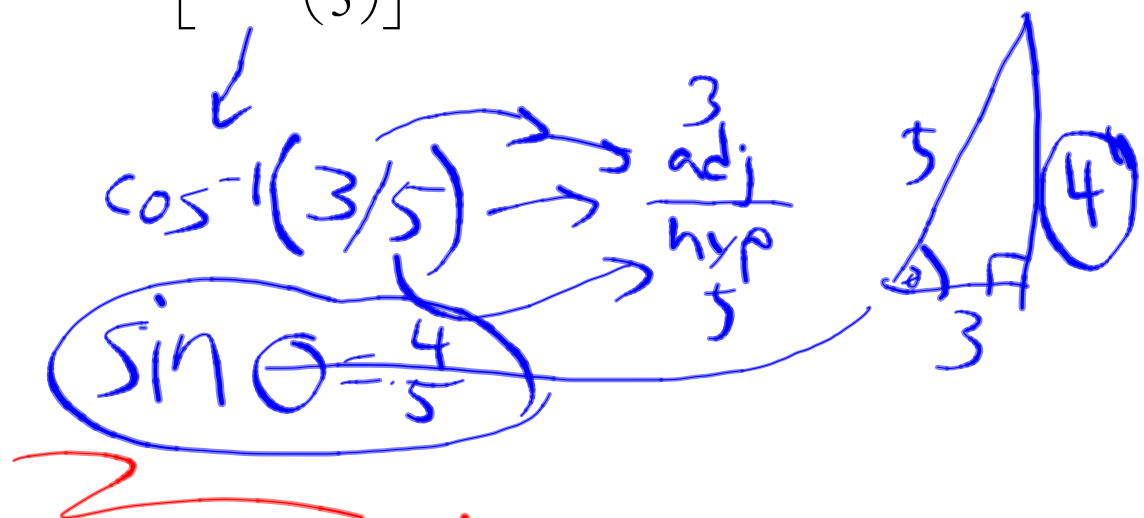


### 8.3 solving trig equations

8.2 / 37

$$\sin \left[ \cos^{-1} \left( \frac{3}{5} \right) \right] =$$



$$\cos^{-1} \left( \frac{3}{5} \right) = .927295218$$

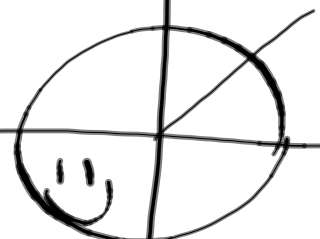
$$\sin(.927295218) = .8$$

8.2  
34)

$$\cos^{-1}\left(\cos\left(\frac{5\pi}{4}\right)\right)$$

$$\cos^{-1}\left(-\frac{1}{\sqrt{2}}\right) = \frac{3\pi}{4}$$

~~$\frac{5\pi}{4}$~~



$\cos^{-1}(+1)$



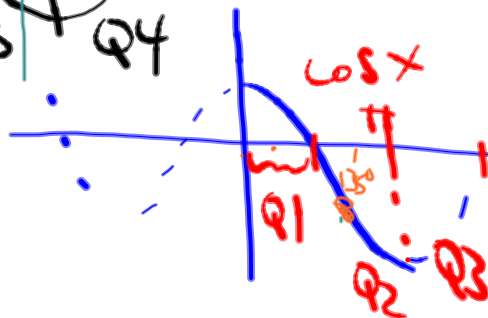
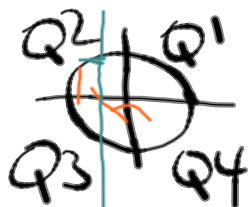
$$1 \frac{\pi}{4} \text{ rad} = \frac{(180)^\circ}{4}$$

$$2 \frac{\pi}{4}$$

$$90^\circ$$

$$3 \frac{\pi}{4}$$

Q2



$$4 \frac{\pi}{4}$$

$$180^\circ$$

$$5 \frac{\pi}{4}$$

Q3

A

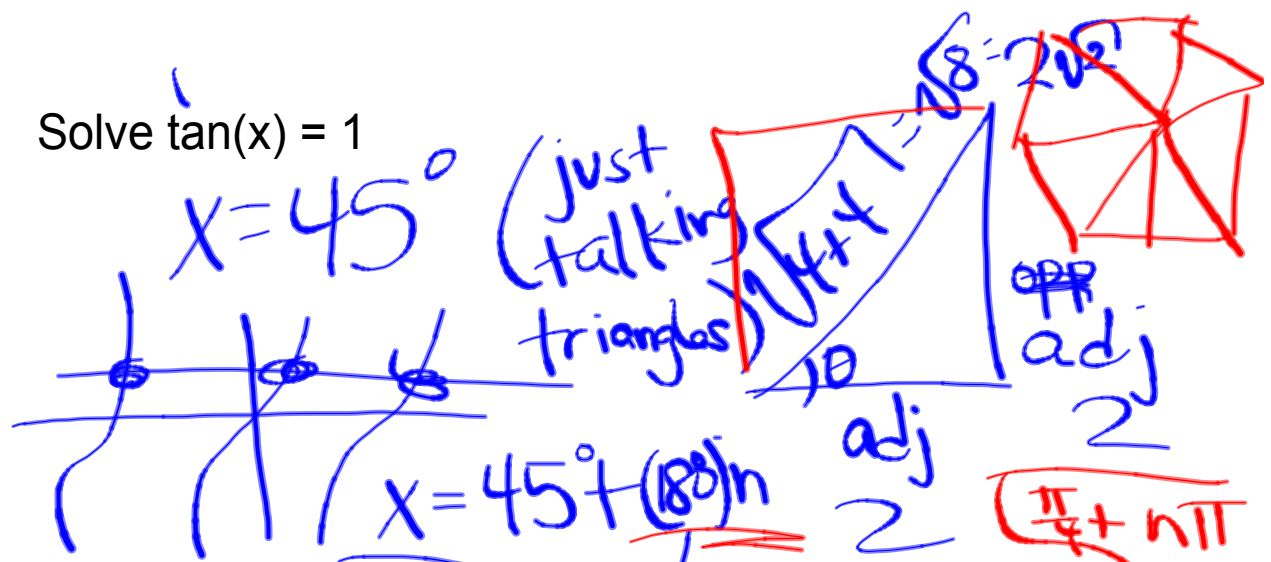
Points to remember!!

$\cos^{-1}$   $\sin^{-1}(x)$  is NOT THE SAME as  $\frac{1}{\sin(x)}$   
 $\cos^{-1}$   $\sin^{-1}(x)$  has a VERY restricted domain! — Dom:  $[-1, 1]$   
D:  $[-1, 1]$  + RANGE:  $[-\frac{\pi}{2}, \frac{\pi}{2}]$   
R:  $[0, \pi]$

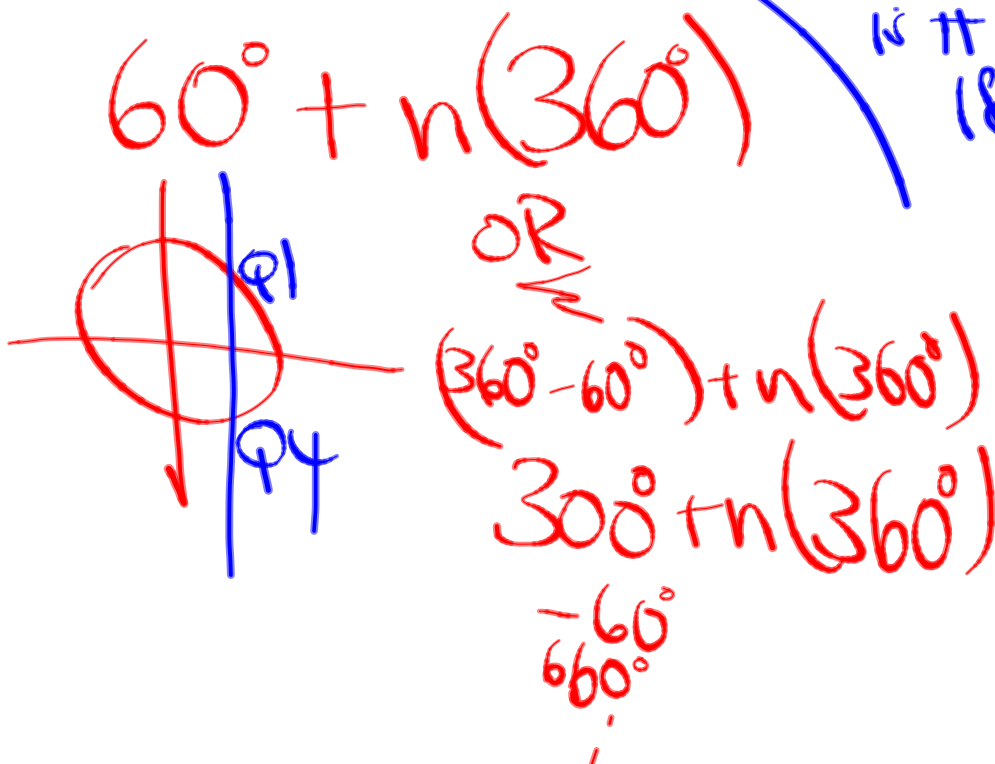
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Solve  $\tan(x) = 1$



Solve  $\cos(x) = 1/2$



Using inverse sine, cosine, and tangent



Solve  $8\cos(x) - 1 = 0$

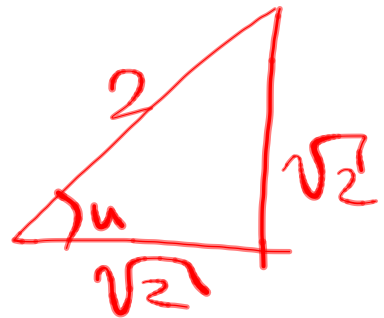
$$\begin{aligned}x &= 82.82^\circ + n(360^\circ) \\ &= (360 - 82.82) + n(360^\circ) \\ &= 277.18^\circ + n(360^\circ)\end{aligned}$$

Solve  $\sin(u) = \frac{\sqrt{2}}{2}$  (aka  $\frac{1}{\sqrt{2}}$ )



$$\begin{aligned}u &= 45^\circ + n(360^\circ) \\ &= 180 - 45\end{aligned}$$

$$135^\circ + n(360^\circ)$$



∴

Solve  $\sin(2x)$  =  $\frac{\sqrt{2}}{2}$   $\left( aka \frac{1}{\sqrt{2}} \right)$

$$2x = 45^\circ + n(360^\circ)$$

$$x = \frac{45}{2} + \frac{n(360)}{2}$$

$$= 22.5 + n(180^\circ)$$

$$2x = 135^\circ + n(360)$$

$$x = 67.5 + n(180)$$

Solve  $3\sin^2(x) - \sin(x) - 2 = 0$  using your skill in solving c

$$3s^2 - s - 2 = 0$$

$$(3s+2)(s-1) = 0$$

$$s = -\frac{2}{3}, s = 1$$

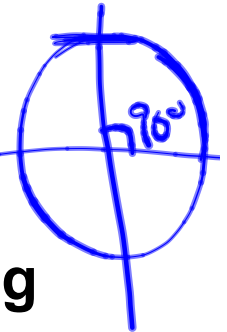
2 soln: Q3 or Q4

$$\sin x = -\frac{2}{3}$$

or

$$\sin x = 1$$

$$x = \frac{\pi}{2} + n(2\pi)$$



Solve  $\tan(x)\cos^2(x) = \tan(x)$  by factoring

$$\tan x \cos^2(x) - \tan x = 0$$

$$\tan x (\cos^2 x - 1) = 0$$

$$\tan x = 0$$

$$x = 0 \pm n\pi$$

$$\cos^2 x - 1 = 0$$

trick

$$\sin^2 + \cos^2 = 1$$

$$\cos^2 - 1 = -\sin^2$$

$$-\sin^2 x = 0$$

$$\sin x = 0$$

$$\cos^2 x = 1$$

$$(\cos x = +1 \text{ or } \cos x = -1)$$

$$\cos x = -1$$

$$\sin^{-1}(x) = \arcsin(x)$$



HW: 8.3 / 1-17 odd, 33-37 odd

Watch out for simplification by TRIG IDENTITY  
Solve:  $-10\cos^2(x) - 3\sin x + 9 = 0$